

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

Amendments to the Claims:

Listing of Claims:

Claim 1 (currently amended): A metal layer structure comprising:

- a substrate;
- 5 a first dielectric layer on a surface of the substrate;
- at least one metal structure disposed in the first dielectric layer;
- a second dielectric layer disposed on the first dielectric layer and the metal structure;
- at least one first conductor on the first dielectric layer; and
- at least one second conductor on the first dielectric layer, the second conductor
- 10 having at least one thin portion; and;
- at least one conductive plug disposed in the second dielectric layer for connecting
- the first conductor, the second conductor and the metal structure.

Claim 2 (original): The metal layer structure of claim 1 wherein the second conductor has
15 at least one thick portion.

Claim 3 (original): The metal layer structure of claim 2 wherein a thickness of the first
conductor is equal to a thickness of the thick portion.

20 Claim 4 (original): The metal layer structure of claim 2 wherein a ratio of a thickness of
the thick portion to a thickness of the thin portion is approximately 1 to 8.

Claim 5 (original): The metal layer structure of claim 2 wherein a thickness of the thick
portion is approximately 0.8 to 1.6 μ m, and a thickness of the thin portion is smaller than
25 0.8 μ m.

Claim 6 (currently amended): The metal layer structure of claim 1 further comprising:
a first opening exposing the first conductor;

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

a second opening exposing the thin portion; and
a ~~second~~third dielectric layer on the first dielectric layer that covers the first conductor and the second conductor.

5 Claim 7 (currently amended): The metal layer structure of claim 6 wherein the ~~second~~third dielectric layer is a PE-oxide layer.

Claim 8 (canceled)

10 Claim 9 (currently amended): The metal layer structure of claim 81 wherein the metal structure is copper (Cu).

Claim 10 (currently amended): The metal layer structure of claim 81 wherein the ~~third~~first dielectric layer is a low-k dielectric layer.

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Claim 11 (currently amended): The metal layer structure of claim 81 wherein the metal structure is copper, and the ~~third~~first dielectric layer is a low-k dielectric layer.

20 Claim 12 (original): The metal layer structure of claim 11 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

Claim 13 (original): The metal layer structure of claim 11 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

25 Claim 14 (currently amended): A metal layer structure comprising:
a substrate;
a first dielectric layer on a surface of the substrate;
at least one metal structure disposed in the first dielectric layer;

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

a second dielectric layer disposed on the first dielectric layer and the metal structure;
at least one first conductor on the first dielectric layer; and
at least one second conductor on the first dielectric layer; and
at least one conductive plug disposed in the second dielectric layer for connecting

5 the first conductor, the second conductor and the metal structure;
wherein the first conductor and the second conductor have a first thickness and a second thickness, respectively, and the first thickness and the second thickness impart different functions to the first conductor and second conductor, respectively.

10 Claim 15 (original): The metal layer structure of claim 14 wherein a ratio of the first thickness to the second thickness is approximately 1 to 8.

Claim 16 (original): The metal layer structure of claim 14 wherein the first thickness is approximately 0.8 to 1.6 μ m, and the second thickness is smaller than 0.8 μ m.

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Claim 17 (currently amended): The metal layer structure of claim 14 further comprising:
a first opening exposing the first conductor;
a second opening exposing the second conductor; and
a ~~second~~^{third} dielectric layer on the first dielectric layer that covers the first

20 conductor and the second conductor.

Claim 18 (currently amended): The metal layer structure of claim 17 wherein the ~~second~~^{third} dielectric layer is a PE-oxide layer.

25 Claim 19 (canceled)

Claim 20 (currently amended): The metal layer structure of claim 14 wherein the metal structure is copper (Cu).

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

Claim 21 (currently amended): The metal layer structure of claim ~~49~~¹⁴ wherein the ~~third~~^{first} dielectric layer is a low-k dielectric layer.

5 Claim 22 (currently amended): The metal layer structure of claim ~~49~~¹⁴ wherein the metal structure is copper, and the ~~third~~^{first} dielectric layer is a low-k dielectric layer.

Claim 23 (original): The metal layer structure of claim 22 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

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Claim 24 (original): The metal layer structure of claim 22 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

Claim 25 (currently amended): A fuse structure comprising:

15 a substrate, a bonding pad area and a fuse area being included on a surface of the substrate;

a first dielectric layer on the surface of the substrate;

at least one metal structure disposed in the first dielectric layer;

a second dielectric layer disposed on the first dielectric layer and the metal structure;

20 at least one first conductor on the first dielectric layer in the bonding pad area; and

at least one second conductor on the first dielectric layer in the fuse area; and

at least one conductive plug disposed in the second dielectric layer for connecting the first conductor, the second conductor and the metal structure;

25 wherein the first conductor having a first thickness is used as a bonding pad, and the second conductor having a second thickness smaller than the first thickness is used as a fuse.

Claim 26 (original): The fuse structure of claim 25 wherein a ratio of the first thickness to

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

the second thickness is approximately 1 to 8.

Claim 27 (original): The fuse structure of claim 25 wherein the first thickness is approximately 0.8 to 1.6 μ m, and the second thickness is smaller than 0.8 μ m.

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Claim 28 (currently amended): The fuse structure of claim 25 further comprising:

a first opening exposing the first conductor;
a second opening exposing the second conductor; and
a ~~second~~^{third} dielectric layer on the first dielectric layer that covers the first

10 conductor and the second conductor.

Claim 29 (currently amended): The fuse structure of claim 28 wherein the ~~second~~^{third} dielectric layer is a PE-oxide layer.

15 Claim 30 (canceled)

Claim 31 (currently amended): The fuse structure of claim 30~~25~~ wherein the metal structure is copper (Cu).

20 Claim 32 (currently amended): The fuse structure of claim 30~~25~~ wherein the ~~third~~^{first} dielectric layer is a low-k dielectric layer.

Claim 33 (currently amended): The fuse structure of claim 30~~25~~ wherein the metal structure is copper, and the ~~third~~^{first} dielectric layer is a low-k dielectric layer.

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Claim 34 (original): The fuse structure of claim 33 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

Appl. No. 10/711,790
Amtd. dated August 15, 2006
Reply to Office action of May 16, 2006

Claim 35 (original): The fuse structure of claim 33 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

Claim 36 (currently amended): A fuse structure comprising:

- 5 a substrate, a fuse area being included on a surface of the substrate;
- a first dielectric layer on the surface of the substrate;
- at least one metal structure disposed in the first dielectric layer;
- a second dielectric layer disposed on the first dielectric layer and the metal structure;
- at least one fuse on the firstsecond dielectric layer in the fuse area, the fuse having a
- 10 thin portion and a thick portion;
- at least one conductive plug disposed in the second dielectric layer for connecting the fuse and the metal structure;
- a secondthird dielectric layer on the firstsecond dielectric layer that covers the thick portion; and
- 15 a first opening in the secondthird dielectric layer exposing the thin portion.

Claim 37 (original): The fuse structure of claim 36 wherein a ratio of a thickness of the thick portion to a thickness of the thin portion is approximately 1 to 8.

- 20 Claim 38 (original): The fuse structure of claim 36 wherein a thickness of the thick portion is approximately 0.8 to 1.6 μ m, and a thickness of the thin portion is smaller than 0.8 μ m.

Claim 39 (currently amended): The fuse structure of claim 36 further comprising:

- 25 at least one bonding pad on the firstsecond dielectric layer in a bonding pad area;
- a second opening in the secondthird dielectric layer exposing the bonding pad; and
- a thirdfourth dielectric layer on the secondthird dielectric layer that covers the thin portion.

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

Claim 40 (currently amended): The fuse structure of claim 39 wherein the ~~third~~^{fourth} dielectric layer is a PE-oxide layer.

5 Claim 41 (canceled)

Claim 42 (currently amended): The fuse structure of claim 41~~36~~ wherein the metal structure is copper (Cu).

10 Claim 43 (currently amended): The fuse structure of claim 41~~36~~ wherein the ~~fourth~~^{first} dielectric layer is a low-k dielectric layer.

Claim 44 (currently amended): The fuse structure of claim 41~~36~~ wherein the metal structure is copper, and the ~~fourth~~^{first} dielectric layer is a low-k dielectric layer.

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Claim 45 (original): The fuse structure of claim 44 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.

20 Claim 46 (original): The fuse structure of claim 44 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

Claim 47 (currently amended): A metal layer structure comprising:

25 a substrate;
a first dielectric layer on a surface of the substrate;
~~at least one metal structure disposed in the first dielectric layer;~~
~~a second dielectric layer disposed on the first dielectric layer and the metal structure;~~
at least one first conductor on the first dielectric layer; and
at least one second conductor on the first dielectric layer; and

Appl. No. 10/711,790
Amtd. dated August 15, 2006
Reply to Office action of May 16, 2006

at least one conductive plug disposed in the second dielectric layer for connecting the first conductor, the second conductor and the metal structure;

wherein the first conductor having a first thickness is a first material, and the second conductor having a second thickness different from the first thickness is a second material.

5 Claim 48 (original): The metal layer structure of claim 47 wherein a ratio of the first thickness to the second thickness is approximately 1 to 8.

10 Claim 49 (original): The metal layer structure of claim 47 wherein the first thickness is approximately 0.8 to 1.6 μ m, and the second thickness is smaller than 0.8 μ m.

Claim 50 (currently amended): The metal layer structure of claim 47 further comprising:
15 a first opening exposing the first conductor;
a second opening exposing the second conductor; and
a ~~second~~^{third} dielectric layer on the first dielectric layer that covers the first conductor and the second conductor.

20 Claim 51 (currently amended): The metal layer structure of claim 50 wherein the ~~second~~^{third} dielectric layer is a PE-oxide layer.

Claim 52 (canceled)

25 Claim 53 (currently amended): The metal layer structure of claim ~~52~~⁴⁷ wherein the metal structure is copper (Cu).

Claim 54 (currently amended): The metal layer structure of claim ~~52~~⁴⁷ wherein the ~~third~~^{first} dielectric layer is a low-k dielectric layer.

Appl. No. 10/711,790
Amdt. dated August 15, 2006
Reply to Office action of May 16, 2006

Claim 55 (currently amended): The metal layer structure of claim 52~~47~~ wherein the metal structure is copper, and the ~~third~~first dielectric layer is a low-k dielectric layer.

5 **Claim 56 (original): The metal layer structure of claim 55 wherein a dielectric constant of the low-k dielectric layer is approximately 2.0 to 3.5.**

Claim 57 (original): The metal layer structure of claim 55 wherein the low-k dielectric layer comprises a carbon-contained oxide layer or an inorganic dielectric material layer.

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Claim 58 (new): The metal layer structure of claim 2 wherein the thick portion and the thin portion of the second conductor comprise same material.

15 **Claim 59 (new): The metal layer structure of claim 14 wherein the first conductor having the first thickness and the second conductor having the second thickness comprise same material.**

20 **Claim 60 (new): The fuse structure of claim 25 wherein the first conductor having the first thickness and the second conductor having the second thickness comprise same material.**

Claim 61 (new): The fuse structure of claim 36 wherein the thick portion and the thin portion of the fuse comprise same material.

25 **Claim 62 (new): The metal layer structure of claim 47 wherein the first conductor having the first thickness and the second conductor having the second thickness comprise same material.**